

PCT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
United States Patent and Trademark
Office
Box PCT
Washington, D.C.20231
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 18 August 2000 (18.08.00)	
International application No. PCT/GB99/04137	Applicant's or agent's file reference DJC/DMB/Q867
International filing date (day/month/year) 09 December 1999 (09.12.99)	Priority date (day/month/year) 15 December 1998 (15.12.98)
Applicant BRAIN, Ronnie et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

13 July 2000 (13.07.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer S. Mafla
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

NOTIFICATION RELATING TO PRIORITY CLAIM

(PCT Rules 26bis.1 and 26bis.2 and
Administrative Instructions, Sections 402 and 409)

From the INTERNATIONAL BUREAU

To:

NEILL, Alastair, William
Appleyard Lees
15 Clare Road
Halifax
West Yorkshire HX1 2HY
ROYAUME-UNI

Date of mailing (day/month/year) 06 March 2000 (06.03.00)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference DJC/DMB/Q867	
International application No. PCT/GB99/04137	International filing date (day/month/year) 09 December 1999 (09.12.99)
Applicant BRAIN, Ronnie et al	

The applicant is hereby notified of the following in respect of the priority claim(s) made in the international application.

1. ☐ **Correction of priority claim.** In accordance with the applicant's notice received on: ,
the following priority claim has been corrected to read as follows:
 - ☐ even though the indication of the number of the earlier application is missing.
 - ☐ even though the following indication in the priority claim is not the same as the corresponding indication appearing in the priority document:
2. ☒ **Addition of priority claim.** In accordance with the applicant's notice received on: 16 February 2000 (16.02.00),
the following priority claim has been added:
GB 27 April 1999 (27.04.99) 9909543.2
 - ☐ even though the indication of the number of the earlier application is missing.
 - ☐ even though the following indication in the priority claim is not the same as the corresponding indication appearing in the priority document:
3. ☒ As a result of the correction and/or addition of (a) priority claim(s) under items 1 and/or 2, the (earliest) priority date is:
15 December 1998 (15.12.98)
4. ☐ **Priority claim considered not to have been made.**
 - ☐ The applicant failed to respond to the Invitation under Rule 26bis.2(a) (Form PCT/IB/316) within the prescribed time limit.
 - ☐ The applicant's notice was received after the expiration of the prescribed time limit under Rule 26bis.1(a).
 - ☐ The applicant's notice failed to correct the priority claim so as to comply with the requirements of Rule 4.10.

The applicant may, before the technical preparations for international publication have been completed and subject to the payment of a fee, request the International Bureau to publish, together with the international application, information concerning the priority claim. See Rule 26bis.2(c) and the PCT Applicant's Guide, Volume I, Annex B2(1B).
5. ☐ In case where multiple priorities have been claimed, the above item(s) relate to the following priority claim(s):
6. A copy of this notification has been sent to the receiving Office and
 - ☒ to the International Searching Authority (where the international search report has not yet been issued).
 - ☒ the designated Offices (which have already been notified of the receipt of the record copy).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Jocelyne Rey-Millet
Facsimile No. (41-22) 740.14.35	Telephone No. (41-22) 338.83.38

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference DJC/DMB/Q867	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/04137	International filing date (<i>day/month/year</i>) 09/12/1999	Priority date (<i>day/month/year</i>) 15/12/1998
International Patent Classification (IPC) or national classification and IPC B25B27/18		
Applicant BRAIN, Ronnie et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 7 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

I ☒ Basis of the report

II ☐ Priority

III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

IV ☐ Lack of unity of invention

V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

VI ☐ Certain documents cited

VII ☒ Certain defects in the international application

VIII ☒ Certain observations on the international application

Date of submission of the demand 13/07/2000	Date of completion of this report 22.12.2000
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465 </div> </div>	Authorized officer Jeggy, T Telephone No. +49 89 2399 7341



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/04137

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-14 as originally filed

Claims, No.:

1-26 as originally filed

Drawings, sheets:

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
 - ☐ the language of publication of the international application (under Rule 48.3(b)).
 - ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:
- ☐ contained in the international application in written form.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority in written form.
 - ☐ furnished subsequently to this Authority in computer readable form.
 - ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
 - ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB99/04137

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	12, 20
	No:	Claims	1-11, 13-19, 21-26
Inventive step (IS)	Yes:	Claims	20
	No:	Claims	1-19, 21-26
Industrial applicability (IA)	Yes:	Claims	1-26
	No:	Claims	

2. Citations and explanations
s e separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
s e separate sheet

Re Item VIII

Certain observations on the international application

VIII.1 Claim 2 is not clear (Article 6 PCT). Claim 2 defines that the fastening member comprises a nut or a stud. It is clear from claim 1 and the aim of the invention that the tool is suitable for aiding the removal of a fastening member, i. e. the fastening member is not part of the subject-matter of claim. Claim 2 should be written in the following way :

Cl 2 : a tool according to claim 1, wherein ***the tool is suitable for removing either a nut or a stud***

In the following report, claim 2 is examined with this new definition.

VIII.2 It is clear from the description on page 10, line 18 - page 11, line 17 that the following feature is essential to the use of a spring mounted mandrel :

(1) ***the tapered end (41) of the mandrel (38) is projecting beyond the blades (31), through a passage way 42 in the blade member***

Indeed, this allows a better centring of the tool prior the hammering on the tool to deform of the exposed end face of the fastening member. Since dependent claim 20 does not contain this feature, it does not meet the requirement of the PCT in respect to Article 6 PCT. In the following report, claim 20 is examined with this added feature (see Item V.3).

Re Item V

Reasoned statement under Article 35 (2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

V.1 Cited documents

Reference is made to the following documents :

D1 : US-A-4 572 035 (E.C.EISENHAUER) 25 February 1986 (1986-02-25)

D2 : US-A-4 713 990 (D.C.POLING) 22 December 1987 (1987-12-22)

D3 : US-A-5 068 954 (R.L.HOUSKA) 3 December 1991 (1991-12-03)

V.2 Claim 1

The document D1 discloses (the references in parentheses applying to this document) a tool (10, Figure 1) for aiding the removal of a fastening member from a structure to which it is attached by means of a threaded connection (Column 1, lines 6-10, Figure 1), the tool (10) comprising :

- a- an elongate body member (11) having first (12) and second end (20)
- b- the first end (12) having means (13) for deforming an end face of the fastening member to provide an area of purchase thereon (Column 2, lines 54-61)
- c- means (19, 21 and wrench handle described in Column 2, lines 62-63) to cause rotation of the fastening member to unscrew the fastening member from the structure (Column 2, lines 61-68)

The subject-matter of claim 1 is therefore not new (Article 33 (2) EPC). Note that documents D2 (Figure 1) and D3 (Figure 2 ; Abstract) disclose also the subject-matter of claim 1.

Dependent claims 2-11, 13-19 and 21-22 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33 (2) PCT), the reasons being as follows :

- Cl 2 : see D1, nuts 26, 43 and 55 on Figures 1, 6 and 7. See also D2 with stud 10 on Figures 1A-B and D4 with stud 14
- Cl 3-4 : see D1, square impact handle receiving socket 19. See also D2 with shank end 22 and D3 with ridges and grooves incorporated into the outside surface of the tool (Column 3, lines 11-18)
- Cl 5-6 : see D1, Column 2, lines 61-68. See also D2 with impact wrench tool 16 (Column 3, lines 7-17)
- Cl 7-8 : see D1 with cutting means (13). See also D2 with cutting means 34 and

- D3 with cutting means 26
- CI 9 : see D1 with aperture 15 on Figure 1. See also D2 with aperture on Figure 2C
- CI 10 : see D3, Column 2, line 67 - Column 3, line 2
- CI 11 : see D3, claim 9
- CI 13-15 : see D1, at least Figure 1
- CI 16-17, see D1, Figure 1. See also D3, Figure 2
- CI 18-19 : see D3, Figure 2, with tapered end 26
- CI 21-22 : see D1, Figure 7 with use of outer cylindrical shape of tool 10

Dependent claim 12 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step (Article 33 (3) PCT), obvious construction, starting from D3 (the cuttings means demountably attached to the elongated body, which allows the use of different bits)

V.3 The subject-matter of dependent claim 20 (see Item VIII.2) is neither known from, nor rendered obvious by, the available prior art. This allows a better centring of the tool prior the hammering on the tool to deform of the exposed end face of the fastening member. The problem to be solved may therefore be regarded as to provide an improved locating means. None of the documents cited in the search report discloses or suggest the using a mandrel which is spring mounted within the body member, the tip of the mandrel extending beyond the blades of the tool.

V.4 Claim 23

The document D1 discloses (the references in parentheses applying to this document) a method for facilitating the removal of a fastening member from a structure to which it is attached by means of a threaded connection (Column 1, lines 6-10), the method comprising :

- a- deforming an exposed end face of the fastening member to provide an area of purchase thereon (Column 2, lines 54-61)
- b- rotating the fastening member using said area of purchase (Column 2, line 61 - Column 3, line 10)

The subject-matter of claim 23 is therefore not new (Article 33 (2) EPC). Note that documents D2 (Column 3, lines 7-17) and D3 (Column 3, lines 36-60) disclose also the subject-matter of claim 1.

Dependent claims 24-26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33 (2) PCT) ; see D1 (Figure 7 ; Column 3, lines 48-64) for claims 24-26 ; see D2 (Figure 1 A-B) and D3 (Figure 2) for claims 24-25

Re Item VII

Certain defects in the international application

VII.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

VII.2 Independent claims 1 and 23 are not in the two-part form in accordance with Rule 6 (3) (b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6 (3) (b) (i) PCT) and with the remaining features being included in the characterising part (Rule 6 (3) (b) (ii) PCT).

VII.3 The features of the claims are provided with reference signs placed in parentheses but reference signs for all the embodiments are not indicated in the claims, specially in the independent ones.

VII.4 The units of measure employed on pages 3 and 7 are not **additionally** expressed in terms of the units stipulated by Rule 10 (1) (a) PCT.

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ EP

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty and hereby elects all eligible States (except where otherwise indicated).

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION	
Applicant's or agent's file reference DJC/DMB/Q867	
International application No. PCT/GB99/04137	International filing date (day/month/year) 9 December 1999
(Earliest) Priority date (day/month/year) 15 December 1998	
Title of invention Mechanical Nut and Stud Removal Tool	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
BRAIN, Ronnie Old Station House Green Row Methley West Yorkshire LS26 9BR	
Telephone No.:	
Facsimile No.:	
Teleprinter No.:	
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
BRAIN, David 14 Brook Street Fryston village Castleford WF10 2PL West Yorkshire GB	
State (that is, country) of nationality: GB	State (that is, country) of residence: GB
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)	
State (that is, country) of nationality:	State (that is, country) of residence:
<input type="checkbox"/> Further applicants are indicated on a continuation sheet.	

Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCEThe following person is ☒ agent ☐ common representativeand ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

CHUGG, David John; NEILL, Alastair William; SHERRARD-SMITH, Hugh; PIDGEON, Robert John; BRIERLEY, Anthony Paul; BRANDON, Paul Laurence; CHUGG, David John; WALSH, David Patrick; ROBINSON, Ian Michael; PERRY, Julie Elizabeth; WADDINGTON, Dick

ALL OF APPLEYARD LEES: 15 Clare Road, Halifax, West Yorkshire HX1 2HY, GB

Telephone No.:

01422 330110

Facsimile No.:

01422 330090

Teleprinter No.:

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.**Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION****Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☐ the international application as originally filedthe description ☒ as originally filed☐ as amended under Article 34the claims ☒ as originally filed☐ as amended under Article 19 (together with any accompanying statement)☐ as amended under Article 34the drawings ☒ as originally filed☐ as amended under Article 342. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.3. ☐ The applicant wishes the start of the international preliminary examination to be postponed until the expiration of 20 months from the priority date unless the International Preliminary Examining Authority receives a copy of any amendments made under Article 19 or a notice from the applicant that he does not wish to make such amendments (Rule 69.1(d)). *(This check-box may be marked only where the time limit under Article 19 has not yet expired.)*

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination:

☐ which is the language in which the international application was filed.☐ which is the language of a translation furnished for the purposes of international search.☐ which is the language of publication of the international application.☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.**Box No. V ELECTION OF STATES**The applicant hereby elects all eligible States *(that is, all States which have been designated and which are bound by Chapter II of the PCT)*

excluding the following States which the applicant wishes not to elect:

Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

- | | | |
|--|---|--------|
| 1. translation of international application | : | sheets |
| 2. amendments under Article 34 | : | sheets |
| 3. copy (or, where required, translation) of amendments under Article 19 | : | sheets |
| 4. copy (or, where required, translation) of statement under Article 19 | : | sheets |
| 5. letter | : | sheets |
| 6. other (specify) | : | sheets |

For International Preliminary
Examining Authority use only

received	not received
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 4. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> separate signed power of attorney | 5. <input type="checkbox"/> nucleotide and or amino acid sequence listing in computer readable form |
| 3. <input type="checkbox"/> copy of general power of attorney, reference number, if any: | 6. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).



CHUGG, David John
Professional Representative

13 July 2000

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.

☐ The applicant has been informed accordingly.

4. ☐ The date of receipt of the demand is WITHIN the period of 19 months from the priority date as extended by virtue of Rule 80.5.

5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference
(if desired) (12 characters maximum)

DJC/DMB/9867

Box No. I TITLE OF INVENTION

MECHANICAL NUT AND STUD REMOVAL TOOL

Box No. II APPLICANT

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

BRAIN, Ronnie
Old Station House
Green Row
Methley
West Yorkshire
LS26 9BR
GB

☒ This person is also inventor.

Telephone No.

Facsimile No.

Teleprinter No.

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:



all designated States



all designated States except the United States of America



the United States of America only



the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)

BRAIN, David
14 Brook Street
Fryston Village
Castleford
WF10 2PL
West Yorkshire GB

This person is:

☐ applicant only

☒ applicant and inventor

☐ inventor only (If this check-box is marked, do not fill in below.)

State (that is, country) of nationality:

GB

State (that is, country) of residence:

GB

This person is applicant for the purposes of:



all designated States



all designated States except the United States of America



the United States of America only



the States indicated in the Supplemental Box

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as:



agent



common representative

Name and address: (Family name followed by given name: for a legal entity, full official designation. The address must include postal code and name of country.)

NEILL, Alastair William, SHERRARD-SMITH, Hugh,
PIDGEON, Robert John, BRIERLEY, Anthony Paul,
BRANDON, Paul Laurence, CHUGG, David John,
WALSH, David John, ROBINSON, Ian Michael,
PERRY, Julie Elizabeth, WADDINGTON, Richard

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☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No.V DESIGNATION OF STATES

The following designations are hereby made under Rule 4.9(a) (mark the applicable check-boxes: at least one must be marked):

Regional Patent

- ☒ **AP ARIPO Patent:** GH Ghana, GM Gambia, KE Kenya, LS Lesotho, MW Malawi, SD Sudan, SL Sierra Leone, SZ Swaziland, UG Uganda, ZW Zimbabwe, and any other State which is a Contracting State of the Harare Protocol and of the PCT
- ☒ **EA Eurasian Patent:** AM Armenia, AZ Azerbaijan, BY Belarus, KG Kyrgyzstan, KZ Kazakhstan, MD Republic of Moldova, RU Russian Federation, TJ Tajikistan, TM Turkmenistan, and any other State which is a Contracting State of the Eurasian Patent Convention and of the PCT
- ☒ **EP European Patent:** AT Austria, BE Belgium, CH and LI Switzerland and Liechtenstein, CY Cyprus, DE Germany, DK Denmark, ES Spain, FI Finland, FR France, GB United Kingdom, GR Greece, IE Ireland, IT Italy, LU Luxembourg, MC Monaco, NL Netherlands, PT Portugal, SE Sweden, and any other State which is a Contracting State of the European Patent Convention and of the PCT
- ☒ **OA OAPI Patent:** BF Burkina Faso, BJ Benin, CF Central African Republic, CG Congo, CI Côte d'Ivoire, CM Cameroon, GA Gabon, GN Guinea, GW Guinea-Bissau, ML Mali, MR Mauritania, NE Niger, SN Senegal, TD Chad, TG Togo, and any other State which is a member State of OAPI and a Contracting State of the PCT (if other kind of protection or treatment desired, specify on dotted line)

National Patent (if other kind of protection or treatment desired, specify on dotted line):

- | | |
|--|--|
| <input checked="" type="checkbox"/> AE United Arab Emirates | <input checked="" type="checkbox"/> LR Liberia |
| <input checked="" type="checkbox"/> AL Albania | <input checked="" type="checkbox"/> LS Lesotho |
| <input checked="" type="checkbox"/> AM Armenia | <input checked="" type="checkbox"/> LT Lithuania |
| <input checked="" type="checkbox"/> AT Austria | <input checked="" type="checkbox"/> LU Luxembourg |
| <input checked="" type="checkbox"/> AU Australia | <input checked="" type="checkbox"/> LV Latvia |
| <input checked="" type="checkbox"/> AZ Azerbaijan | <input checked="" type="checkbox"/> MD Republic of Moldova |
| <input checked="" type="checkbox"/> BA Bosnia and Herzegovina | <input checked="" type="checkbox"/> MG Madagascar |
| <input checked="" type="checkbox"/> BB Barbados | <input checked="" type="checkbox"/> MK The former Yugoslav Republic of Macedonia |
| <input checked="" type="checkbox"/> BG Bulgaria | <input checked="" type="checkbox"/> MN Mongolia |
| <input checked="" type="checkbox"/> BR Brazil | <input checked="" type="checkbox"/> MW Malawi |
| <input checked="" type="checkbox"/> BY Belarus | <input checked="" type="checkbox"/> MX Mexico |
| <input checked="" type="checkbox"/> CA Canada | <input checked="" type="checkbox"/> NO Norway |
| <input checked="" type="checkbox"/> CH and LI Switzerland and Liechtenstein | <input checked="" type="checkbox"/> NZ New Zealand |
| <input checked="" type="checkbox"/> CN China | <input checked="" type="checkbox"/> PL Poland |
| <input checked="" type="checkbox"/> CU Cuba | <input checked="" type="checkbox"/> PT Portugal |
| <input checked="" type="checkbox"/> CZ Czech Republic | <input checked="" type="checkbox"/> RO Romania |
| <input checked="" type="checkbox"/> DE Germany | <input checked="" type="checkbox"/> RU Russian Federation |
| <input checked="" type="checkbox"/> DK Denmark | <input checked="" type="checkbox"/> SD Sudan |
| <input checked="" type="checkbox"/> EE Estonia | <input checked="" type="checkbox"/> SE Sweden |
| <input checked="" type="checkbox"/> ES Spain | <input checked="" type="checkbox"/> SG Singapore |
| <input checked="" type="checkbox"/> FI Finland | <input checked="" type="checkbox"/> SI Slovenia |
| <input checked="" type="checkbox"/> GB United Kingdom | <input checked="" type="checkbox"/> SK Slovakia |
| <input checked="" type="checkbox"/> GD Grenada | <input checked="" type="checkbox"/> SL Sierra Leone |
| <input checked="" type="checkbox"/> GE Georgia | <input checked="" type="checkbox"/> TJ Tajikistan |
| <input checked="" type="checkbox"/> GH Ghana | <input checked="" type="checkbox"/> TM Turkmenistan |
| <input checked="" type="checkbox"/> GM Gambia | <input checked="" type="checkbox"/> TR Turkey |
| <input checked="" type="checkbox"/> HR Croatia | <input checked="" type="checkbox"/> TT Trinidad and Tobago |
| <input checked="" type="checkbox"/> HU Hungary | <input checked="" type="checkbox"/> UA Ukraine |
| <input checked="" type="checkbox"/> ID Indonesia | <input checked="" type="checkbox"/> UG Uganda |
| <input checked="" type="checkbox"/> IL Israel | <input checked="" type="checkbox"/> US United States of America |
| <input checked="" type="checkbox"/> IN India | <input checked="" type="checkbox"/> UZ Uzbekistan |
| <input checked="" type="checkbox"/> IS Iceland | <input checked="" type="checkbox"/> VN Viet Nam |
| <input checked="" type="checkbox"/> JP Japan | <input checked="" type="checkbox"/> YU Yugoslavia |
| <input checked="" type="checkbox"/> KE Kenya | <input checked="" type="checkbox"/> ZA South Africa |
| <input checked="" type="checkbox"/> KG Kyrgyzstan | <input checked="" type="checkbox"/> ZW Zimbabwe |
| <input checked="" type="checkbox"/> KP Democratic People's Republic of Korea | |
| <input checked="" type="checkbox"/> KR Republic of Korea | |
| <input checked="" type="checkbox"/> KZ Kazakhstan | |
| <input checked="" type="checkbox"/> LC Saint Lucia | |
| <input checked="" type="checkbox"/> LK Sri Lanka | |

Check-boxes reserved for designating States which have become party to the PCT after issuance of this sheet:

- ☐ IT IS THE INTENTION OF THE APPLICANT
TO DESIGNATE ALL POSSIBLE STATES
BOTH REGIONALLY AND NATIONALLY

Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4.9(b) any other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. (Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving Office within the 15-month time limit.)

Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box.		
Filing date of earlier application (day-month-year)	Number of earlier application	Where earlier application is:		
		national application: country	regional application: regional Office	international application: receiving Office
item (1) 15/12/98 5 December 1998	98 27489.7	GB		
item (2) 08/02/99 8 February 1999	99 02600.7	GB		
item (3) 27/04/1999 27 April 1999	99 09543.2	GB		

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): 1 and 2

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris Convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See Supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) (if two or more International Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used):

Request to use results of earlier search: reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority):

Date (day-month-year)

Number

Country (or regional Office)

ISA /

Box No. VIII CHECK LIST: LANGUAGE OF FILING

This international application contains the following number of sheets:

request : 3

description (excluding sequence listing part) : 14

claims : 4

abstract : 1

drawings : 7

sequence listing part of description : -

Total number of sheets : 29

This international application is accompanied by the item(s) marked below:

1. ☐ fee calculation sheet
2. ☒ separate signed power of attorney
3. ☐ copy of general power of attorney: reference number, if any:
4. ☐ statement explaining lack of signature
5. ☐ priority document(s) identified in Box No. VI as item(s):
6. ☐ translation of international application into (language):
7. ☐ separate indications concerning deposited microorganism or other biological material
8. ☐ nucleotide and/or amino acid sequence listing in computer readable form
9. ☐ other (specify):

Figure of the drawings which should accompany the abstract:

Language of filing of the international application:

Box No. IX SIGNATURE OF APPLICANT OR AGENT

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).



CHUGG, David John
Professional Representative

15.02.00

For receiving Office use only	
1. Date of actual receipt of the purported international application:	2. Drawings: <input type="checkbox"/> received: <input type="checkbox"/> not received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	
5. International Searching Authority (if two or more are competent): ISA /	6. <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid.

For International Bureau use only
Date of receipt of the record copy by the International Bureau:

Am

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

CHUGG, David John et al.
APPLEYARD LEES
15 Clare Road
Halifax, West Yorkshire HX1 2HY
GRANDE BRETAGNE

RECEIVED

28 DEC 2000

APPLEYARD LEES

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing
(day/month/year) 22.12.2000

Applicant's or agent's file reference
DJC/DMB/Q867

IMPORTANT NOTIFICATION

International application No.
PCT/GB99/04137

International filing date (day/month/year)
09/12/1999

Priority date (day/month/year)
15/12/1998

Applicant
BRAIN, Ronnie et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized officer

Edel, M

Tel. +49 89 2399-

2384



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference DJC/DMB/Q867	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB99/04137	International filing date (day/month/year) 09/12/1999	Priority date (day/month/year) 15/12/1998
International Patent Classification (IPC) or national classification and IPC B25B27/18		
Applicant BRAIN, Ronnie et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 7 sheets, including this cover sheet.

- ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 13/07/2000	Date of completion of this report 22.12.2000
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Jeggy, T Telephone No. +49 89 2399 7341 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/04137

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-14 as originally filed

Claims, No.:

1-26 as originally filed

Drawings, sheets:

1/7-7/7 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB99/04137

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	12, 20
	No:	Claims	1-11, 13-19, 21-26
Inventive step (IS)	Yes:	Claims	20
	No:	Claims	1-19, 21-26
Industrial applicability (IA)	Yes:	Claims	1-26
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

Re Item VIII

Certain observations on the international application

VIII.1 Claim 2 is not clear (Article 6 PCT). Claim 2 defines that the fastening member comprises a nut or a stud. It is clear from claim 1 and the aim of the invention that the tool is suitable for aiding the removal of a fastening member, i. e. the fastening member is not part of the subject-matter of claim. Claim 2 should be written in the following way :

CI 2 : a tool according to claim 1, wherein ***the tool is suitable for removing either a nut or a stud***

In the following report, claim 2 is examined with this new definition.

VIII.2 It is clear from the description on page 10, line 18 - page 11, line 17 that the following feature is essential to the use of a spring mounted mandrel :

(1) ***the tapered end (41) of the mandrel (38) is projecting beyond the blades (31), through a passage way 42 in the blade member***

Indeed, this allows a better centring of the tool prior the hammering on the tool to deform of the exposed end face of the fastening member. Since dependent claim 20 does not contain this feature, it does not meet the requirement of the PCT in respect to Article 6 PCT. In the following report, claim 20 is examined with this added feature (see Item V.3).

Re Item V

Reasoned statement under Article 35 (2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

V.1 Cited documents

Reference is made to the following documents :

D1 : US-A-4 572 035 (E.C.EISENHAUER) 25 February 1986 (1986-02-25)

D2 : US-A-4 713 990 (D.C.POLING) 22 December 1987 (1987-12-22)

D3 : US-A-5 068 954 (R.L.HOUSKA) 3 December 1991 (1991-12-03)

V.2 Claim 1

The document D1 discloses (the references in parentheses applying to this document) a tool (10, Figure 1) for aiding the removal of a fastening member from a structure to which it is attached by means of a threaded connection (Column 1, lines 6-10, Figure 1), the tool (10) comprising :

- a- an elongate body member (11) having first (12) and second end (20)
- b- the first end (12) having means (13) for deforming an end face of the fastening member to provide an area of purchase thereon (Column 2, lines 54-61)
- c- means (19, 21 and wrench handle described in Column 2, lines 62-63) to cause rotation of the fastening member to unscrew the fastening member from the structure (Column 2, lines 61-68)

The subject-matter of claim 1 is therefore not new (Article 33 (2) EPC). Note that documents D2 (Figure 1) and D3 (Figure 2 ; Abstract) disclose also the subject-matter of claim 1.

Dependent claims 2-11, 13-19 and 21-22 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33 (2) PCT), the reasons being as follows :

- CI 2 : see D1, nuts 26, 43 and 55 on Figures 1, 6 and 7. See also D2 with stud 10 on Figures 1A-B and D4 with stud 14
- CI 3-4 : see D1, square impact handle receiving socket 19. See also D2 with shank end 22 and D3 with ridges and grooves incorporated into the outside surface of the tool (Column 3, lines 11-18)
- CI 5-6 : see D1, Column 2, lines 61-68. See also D2 with impact wrench tool 16 (Column 3, lines 7-17)
- CI 7-8 : see D1 with cutting means (13). See also D2 with cutting means 34 and

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/04137

- D3 with cutting means 26
- Cl 9 : see D1 with aperture 15 on Figure 1. See also D2 with aperture on Figure 2C
- Cl 10 : see D3, Column 2, line 67 - Column 3, line 2
- Cl 11 : see D3, claim 9
- Cl 13-15 : see D1, at least Figure 1
- Cl 16-17, see D1, Figure 1. See also D3, Figure 2
- Cl 18-19 : see D3, Figure 2, with tapered end 26
- Cl 21-22 : see D1, Figure 7 with use of outer cylindrical shape of tool 10

Dependent claim 12 does not contain any features which, in combination with the features of any claim to which it refers, meet the requirements of the PCT in respect of inventive step (Article 33 (3) PCT), obvious construction, starting from D3 (the cuttings means demountably attached to the elongated body, which allows the use of different bits)

V.3 The subject-matter of dependent claim 20 (see Item VIII.2) is neither known from, nor rendered obvious by, the available prior art. This allows a better centring of the tool prior the hammering on the tool to deform of the exposed end face of the fastening member. The problem to be solved may therefore be regarded as to provide an improved locating means. None of the documents cited in the search report discloses or suggest the using a mandrel which is spring mounted within the body member, the tip of the mandrel extending beyond the blades of the tool.

V.4 Claim 23

The document D1 discloses (the references in parentheses applying to this document) a method for facilitating the removal of a fastening member from a structure to which it is attached by means of a threaded connection (Column 1, lines 6-10), the method comprising :

- a- deforming an exposed end face of the fastening member to provide an area of purchase thereon (Column 2, lines 54-61)
- b- rotating the fastening member using said area of purchase (Column 2, line 61 - Column 3, line 10)

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB99/04137

The subject-matter of claim 23 is therefore not new (Article 33 (2) EPC). Note that documents D2 (Column 3, lines 7-17) and D3 (Column 3, lines 36-60) disclose also the subject-matter of claim 1.

Dependent claims 24-26 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty (Article 33 (2) PCT) ; see D1 (Figure 7 ; Column 3, lines 48-64) for claims 24-26 ; see D2 (Figure 1 A-B) and D3 (Figure 2) for claims 24-25

Re Item VII

Certain defects in the international application

VII.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

VII.2 Independent claims 1 and 23 are not in the two-part form in accordance with Rule 6 (3) (b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6 (3) (b) (i) PCT) and with the remaining features being included in the characterising part (Rule 6 (3) (b) (ii) PCT).

VII.3 The features of the claims are provided with reference signs placed in parentheses but reference signs for all the embodiments are not indicated in the claims, specially in the independent ones.

VII.4 The units of measure employed on pages 3 and 7 are not **additionally** expressed in terms of the units stipulated by Rule 10 (1) (a) PCT.

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference DJC/DMB/Q867	FOR FURTHER ACTION		see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/GB 99/ 04137	International filing date (day/month/year) 09/12/1999	(Earliest) Priority Date (day/month/year) 15/12/1998	
Applicant BRAIN, Ronnie et al.			

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☒ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

8

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 99/04137

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 B25B27/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 572 035 A (E.C.EISENHAUER) 25 February 1986 (1986-02-25) column 2, line 11 - line 15 column 2, line 53 - column 3, line 10 column 3, line 65 - column 4, line 5; figures	1-9, 13-16, 23-25
X	US 4 713 990 A (D.C.POLING) 22 December 1987 (1987-12-22) the whole document	1-9, 23, 24
X	DE 14 78 848 A (H.O.CORDES) 30 January 1969 (1969-01-30) page 6, line 14 - page 7, line 14 page 7, line 20 - line 23; figure 1 -/-	1-4, 7-9, 16, 17, 23, 24

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

29 March 2000

Date of mailing of the international search report

04/04/2000

Name and mailing address of the ISA

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 Fax: (+31-70) 340-3018

Authorized officer

Majerus, H

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 99/04137

C.(Continuation:) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 019 284 A (M.DOROSH) 31 October 1979 (1979-10-31) abstract; figures	1-4, 7, 8, 10, 11, 23
X	US 5 068 954 A (R.L.HOUSKA) 3 December 1991 (1991-12-03) column 2, line 67 -column 3, line 2 abstract; figures	1-4, 10, 16, 23

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/04137

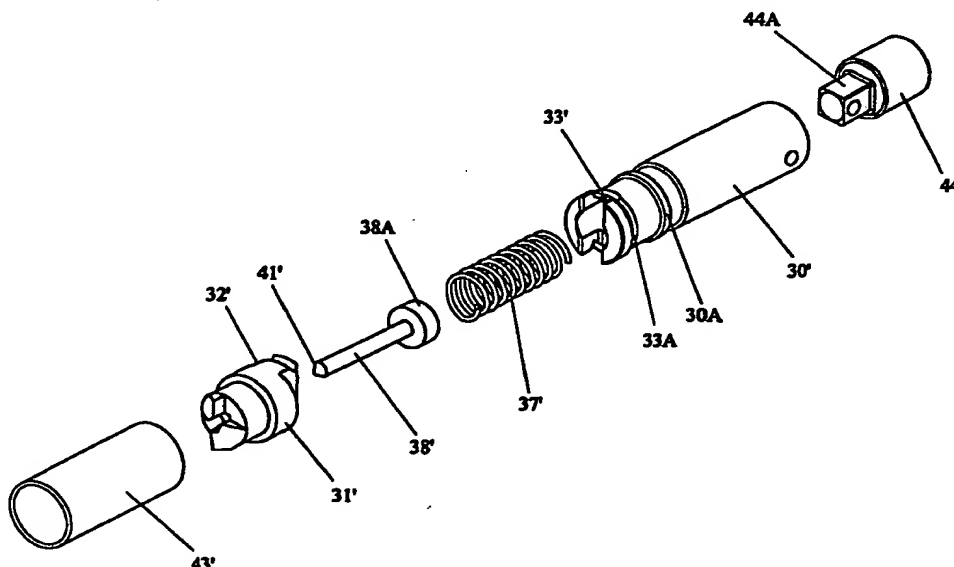
Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4572035	A	25-02-1986	NONE	
US 4713990	A	22-12-1987	NONE	
DE 1478848	A	30-01-1969	NONE	
GB 2019284	A	31-10-1979	CA 1070991 A DE 2915197 A JP 1143975 C JP 54142699 A JP 57036111 B US 4192205 A	05-02-1980 31-10-1979 26-04-1983 07-11-1979 02-08-1982 11-03-1980
US 5068954	A	03-12-1991	CA 2033553 A GB 2247854 A,B	13-03-1992 18-03-1992



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : B25B 27/18		A1	(11) International Publication Number: WO 00/35636
			(43) International Publication Date: 22 June 2000 (22.06.00)
(21) International Application Number: PCT/GB99/04137 (22) International Filing Date: 9 December 1999 (09.12.99) (30) Priority Data: 9827489.7 15 December 1998 (15.12.98) GB 9902600.7 8 February 1999 (08.02.99) GB 9909543.2 27 April 1999 (27.04.99) GB (71)(72) Applicants and Inventors: BRAIN, Ronnie [GB/GB]; Old Station House, Green Row, Methley, West Yorkshire LS26 9BR (GB). BRAIN, David [GB/GB]; 14 Brook Street, Fryston Village, Castleford, West Yorkshire WF10 2PL (GB). (74) Agents: NEILL, Alastair, William et al.; Appleyard Lees, 15 Clare Road, Halifax, West Yorkshire HX1 2HY (GB).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report.	

(54) Title: MECHANICAL NUT AND STUD REMOVAL TOOL



(57) Abstract

The invention concerns a tool for removing fastening members, such as nuts and studs. The tool comprises an elongate body member (30') with first and second ends, the first end having means (31') for deforming an end face of the fastening member to provide an area of purchase thereon; and means (44) to cause rotation of the fastening member to unscrew the fastening member from the structure. Also within the scope of the present invention is a locating means (38') for locating the first end of the body member (30') with respect to the end face of the fastening member as well as a method for enabling removal of fastening members by action upon an end face of a fastening member.

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MECHANICAL NUT AND STUD REMOVAL TOOL

The invention relates to a tool for removing fastening members, in particular to a tool for removing nuts and
5 studs.

Conventionally, nuts or studs would be removed by moving a spanner or a wrench which acts upon the side face of the nut or stud to cause its rotation. However, where
10 the nut or stud has become damaged by its edges having become "rounded", it may be difficult to remove using the normal tools available. Also, in cases where nuts for instance have become seized, removal is problematic.

15 Existing methods for removing seized or damaged fastening members in such conditions involve drilling, burning or cutting the fastening member in question from the object to which they are attached.

20 Another problem which is often encountered concerns situations in which locking nuts have been used, but the specialized tool for unlocking of the nuts is not available.

25 In a common field of application, vehicles with alloy wheels utilize locking wheel nuts to prevent their theft. However, often the vehicle owner will not have the key or tool available in the event of a breakdown, for instance, after sustaining a flat tyre. Breakdown engineers called
30 out to the scene often have very little option other than to tow the vehicle to a garage where further attempts would be made to remove the vehicle wheel in question. However, attempts at removal without the proper key or tool (which

may well be for all practical purposes unique to the particular vehicle on which the alloy wheels are fitted) often result in damage to the wheel and add considerable time and expense to the repairs.

5

It will be appreciated that in the case of locking wheel nuts and in the case of seized or damaged fastening members in other situations, it may be only the end face of the particular fastening member which is accessible so that
10 getting a good grip around the circumference of the fastening member is not a viable option.

In such cases, being able to only access the end face exacerbates the problem. Indeed, in the case of locking
15 wheel nuts in particular there is often an outer shell which is arranged to be freely rotating with respect to a concealed and protected member underneath and in those cases attacking the outer shell using hammer and chisel etc or attempting to drill into the wheel nuts often results in
20 the chisel face or the drill bit skating across the locking wheel nut and damaging the valuable alloy wheels.

It is an aim of preferred embodiments of the present invention to provide a tool for aiding the removal of
25 fastening members which avoids, or alleviates to at least some extent, at least one of the problems described above in relation to the prior art.

According to a first aspect of the invention, there is
30 provided a tool for aiding the removal of a fastening member from a structure to which it is attached by means of a threaded connection, the tool comprising: an elongate body member having first and second ends, the first end

having means for deforming an end face of the fastening member to provide an area of purchase thereon; and

means to cause rotation of the fastening member to
5 unscrew the fastening member from the structure.

The fastening member may comprise a nut or stud.

Preferably, said means to cause rotation comprise
10 attachment means for the attachment of an operating member.
The attachment means is preferably located at the second end of the body member.

The attachment means may comprise a standard
15 connection, such as a half inch square drive in the form of a male or female connection. Other standard or specialised connections may alternatively be employed of course.

The operating member may comprise an impact means such
20 as an impact driver for both imparting a blow to the tool and providing the means for rotation. An impact driver may be provided with the tool as an integrated package.

It is also within the scope of the invention that a
25 first operating member may be linked to the tool by way of the attachment means in a first step so as to provide an impact to the tool, and a second, different operating member may be connected to the attachment means during a second step for providing said rotation. The first
30 operating means may comprise a bar or similar for receiving a blow from a hammer, and the second operating member may comprise, for instance, a wheel brace.

The means for deforming the fastening member may comprise at least one cutting means such as a blade or a blade ring having blades arranged around an aperture formed in the blade ring for biting into said end face. The blade
5 may be demountably attached to the elongate body. The blade may include an angled cutting edge. The tool may include means for securing the blade to the elongate body, such as by grub screws. The blade may be handed, so as to be orientable in a first configuration for use with
10 fastening members having a right hand threaded attachment, and to be orientable in a second configuration for use with fastening members having a left-handed threaded attachment.

The first end of the body member may be provided with
15 an aperture running longitudinally through the centre of the body member. The aperture may run part way through the body member or it may run entirely through the body member. The aperture may couple with the attachment means of the second end. The first end may comprise, in such a way that
20 it forms the attachment means, at least one blade. Preferably two blades, are provided on either side of the aperture. The aperture may enable a bolt or similar object, on which is threaded a fastening member, to be lowered into the body member such that the blades come into
25 contact with an end face of said fastening member.

When situated within the body member, the bolt may form part of the attachment means.

30 It is another aim of certain embodiments to include some means for locating the first end of the body member with respect to the end face of the fastening member.

With a view to fulfilling the above aim, the tool is preferably provided with locating means to locate the first end with respect to the end face of the fastening member.

5 The locating means may comprise centralising means.

The locating means may comprise a mandrel for engagement with the end face of the fastening member.

10 The mandrel may be spring mounted within the body member.

The mandrel may be of male or female type.

15 Preferably the leading end of the mandrel is tapered.

According to another preferred feature of the invention, the tool is provided with means for preventing peripheral damage to the structure.

20

For example a cover or shroud may be provided to surround the means for deforming the end face of the fastening member.

25 According to a second aspect of the invention, there is provided a method for facilitating the removal of a fastening member from a structure to which it is attached by means of a threaded connection, the method comprising:

30 deforming an exposed end face of the fastening member to provide an area of purchase thereon; and

rotating the fastening member using said area of purchase.

The method of the second aspect may include any one or
5 more of the limiting features of the apparatus of the first
aspect in any combination. The method may include the
preliminary step of locating a first end of the tool with
respect to the end face of the fastening member. This
locating step preferably includes the use of the locating
10 means.

Preferred embodiments of the invention will now be
described with reference to the accompanying drawings, in
which:

15

Figure 1 is a perspective view of a tool according to a
first embodiment of the invention;

Figure 2 is an end view of the first embodiment shown
20 in Figure 1;

Figure 3 is a cross-sectional view through the line A-A
of the first embodiment shown in Figure 1;

25 Figure 4 is an end view of a tool according to a second
embodiment of the invention;

Figure 5 is a side elevational view partially in cross-
section of the second embodiment of the invention as shown
30 in Figure 4;

Figure 6A and B show an exemplary formation of a blade of the tool of Figures 4 and 5 in side elevation and front elevation respectively;

5 Figure 7 is a diagrammatic exploded view of an embodiment of the invention including a locating means for locating the tool on an end face of the fastening member; and

10 Figures 8, 9, 10 and 11 are exploded perspective views of three further embodiments of the invention.

Referring to Figure 1 to 3, in the first embodiments of the invention, there is provided a tool comprising an
15 elongate body member 10 having a first end 12 and a second end 16.

The first end 12 includes a cutting blade 14, connected to the elongate body 10 by means of grub screws 20.

20

The second end 16 contains a standard connection means 18, such as a half inch square drive connection, to which an impact driver or other suitable operating member may be attached, as best illustrated in Figure 2.

25

In use, the blade 14 is placed into contact with the exposed end face of the fastening member to be released.

The second end 16 of the body member 10 is impacted by suitable means, such as by striking the end of an attached
30 impact driver with a hammer. The impact causes the blade 14 to deform the end face of the fastening member, by biting into that end face and, in the case where the fastening member is a locking wheel nut having an outer

shell and an inner nut, to cause the outer shell to lock with the inner nut.

Immediately after impact, the action of the impact driver causes rotation of the body member 10 which imparts rotational movement via the blade 14 to the fastening member.

Whilst it will be appreciated that some other operating means may be used to cooperate with the tool - for instance, a hammer could be first used to cause the deforming and a wheel brace could then be attached to the tool to provide the rotation - the use of an impact driver is most preferred. The reason that an impact driver is most preferred in the present invention is that during the imparting of the rotational force, the blade is further positively engaged with the deformed end face of the fastening member so as to provide extra security in use and greatly facilitate removal.

Referring now to Figures 4 and 5, a second embodiment of the invention is shown in plan view and side view (in direction CL of Figure 4) respectively, with hidden detail shown by hatched lines (-----). This embodiment is particularly useful for removing a deformed or seized nut fastened to a bolt. The tool is generally similar to that shown in Figures 1 to 3 and points of similarity designated by like reference numerals will not be discussed further. However, the first end 12 of the tool incorporates a pair of blades 14A, B which are connected to the body member 10 by grub screws 20, running in threaded bores 21 and the two blades are separated by a gap 22 formed by an aperture running through the body member 10. This aperture or

cavity 22 runs longitudinally through the body member and is centrally located along the desired axis of rotation.

Figure 6A and B show a typical blade 14 formation. It will be appreciated that the blade 14 has an angled cutting edge 141 which is arranged, in use, to bite into the end face of the fastening member to be deformed and a flat face 142, generally arranged in use to be at 90° to the end face of the fastening member. The angled face 141 in this way makes the deformation in the fastening member and the flat face is arranged to impart the rotational movement from the tools to the fastening member. The blade is "handed" in this way such that if the pair of blades 14A, B were fixed to the tool in the manner shown in Figures 4 and 5 then the direction of loosening is shown by Arrow "A". Loosening in this manner is brought about by the flat face 142 driving the fastening member. To cope with both left and right handed threads, the blade 14 may be removed and turned around such that the flat face 142 which includes a (optional) recess 143 for location of the grub screw 20, is always arranged to drive the rotation of the fastening member during a loosening operation.

In use, the tool of Figures 4 and 5 is positioned such that the cavity 22 receives the threaded end of a bolt or stud, to which the fastening member desired to be removed, is attached. The fastening member which will be assumed hereinafter to be a nut is brought into contact with the blades 14 by lowering the tool down the length of the bolt thread until the blades 14 engage with the end face of the nut.

Removal or loosening of the nut is then carried out in the same way as mentioned earlier, i.e. by imparting a blow to the second end of the tool 10 and rotating the tool to cause unscrewing of the nut from the bolt.

5

It will be appreciated that the cavity 22 may run throughout the length of the tool 10 and may, in itself, also form the means for connecting an impact driver. In otherwords, the aperture 22 need not be circular, but could adopt a complimentary formation to that of the particular drive means being utilised to facilitate operation.

10

Although two blades are shown in the embodiment of Figures 4 and 5, and a single blade shown in the embodiment of Figures 1 to 3, it will be appreciated that different numbers of blades may be utilised as required.

15

Referring now to Figure 7, there will be described a locating means and method for locating the tool on the end face of the fastening member. As with other embodiments of the invention, the tool shown in Figure 7 has a body member 30 which in use is fitted with blades 31. The blades 31 have a rib 32 which fits into a slot 33 extending across the body member 30.

20

The body member 30 has a passage 34 extending therethrough and within this passage there is a web 35 having a central aperture 36.

25

The lower end of the passageway 34 receives a compression spring 37 and a mandrel 38. The compression spring 37 acts between the mandrel and the web 35. The mandrel 38 is retained in position by a bolt 39 which

30

passes through the hole 36 in the web 35 and into a threaded bore 40 in the mandrel 38. The leading end 41 of the mandrel is tapered.

5 When the tool is presented to the end face of the screw threaded member to be removed, the tapered end 41 of the mandrel 38 is projecting beyond the blades 31, since there is also a passageway 42 through the bladed member.

10 Thus, the leading end of the mandrel 38 may first be adjusted until it is in the exact centre of the exposed end face of the threaded member before an impact is delivered to drive the blades into the end face.

15 When the blades are driven into the end face, the mandrel 38 is depressed further into the body member 30 against the action of the spring 37.

20 To reduce the risk of peripheral damage to the surrounding structure containing the threaded member which is to be removed, the whole tool is provided with a cylindrical sleeve 43 to capture any debris from the blades and prevent this debris from reaching the surrounding structure.

25 The upper part of the passageway 34 may have a square cross section, so that a square key can be inserted into it to provide rotational movement to the tool.

30 The invention is not restricted to the features of the foregoing embodiment. For example, male and female members may be reversed. For example instead of using a male mandrel which fits into a socket in the body, a female

mandrel could be provided which slides over a projecting part of the body.

Figures 8 to 10 show further embodiments of the invention. Where there are presented like elements to those shown in Figure 7, the same reference numbers will be utilized together with a prime ('), double prime ('') or triple prime ('').

The embodiment of Figure 8 is broadly similar to the embodiment of Figure 7 aside from the fact that mandrel 38' is arranged such that the spring 37' locates within passageway 34 (not shown in this Figure) of the body member 30' with the enlarged head 38A having the free end of the spring 37' acting upon it so as to tend to keep the mandrel 38' in a position in which the tapered head 41' remains protruded beyond the end of blade ring 31'. A blade ring 31' is maintained in position in relation to body member 30' by means of the cooperating rib 32' and slot 33', these two elements being kept in association with one another by means of a split ring 33A. On Figure 8, and also shown in Figures 9 and 10, there is further provided an O ring 30A against which an end portion of shroud 43' is arranged to seat. Further, there is shown in each of Figures 8 to 10 an impact bar 44 having a square peg connection 44A for cooperation, in use, with the upper part of passageway 34 which, as discussed already, is of square cross-section.

The main variation between the embodiment of Figure 8 and Figure 9, is that the embodiment of Figure 9 does include a bolt 39'' in similar fashion to the bolt 39 of Figure 7. The bolt 39'' cooperates with a threaded aperture formed in the mandrel 38''. The mandrel 38'' is

of generally enlarged proportions as compared with the mandrel 38'.

5 The embodiment of Figure 10, is most similar to the embodiment shown in Figure 8 and differs simply by the mandrel 38''' being of enlarged proportions as compared to the mandrel 38'.

10 Figure 11 is an exploded view showing the various different interchangeable parts as referred to previously which path for use with the tool. In addition, Figure 11 shows (at reference numeral 45) a plastic shroud which assists in centralising the tool when using the blades shown as 31''' and 31'. It further shows, a centre punch
15 50 which can be utilised prior to using the tool to mark a centre point on a fastening member which is to be loosened.

It will be appreciated that various modifications may be made to the embodiments of the present invention whilst
20 remaining within the scope of the invention. For instance, the invention includes embodiments of the tool incorporating integral impact driver portions as well as embodiments requiring the use of an external impact driver and embodiments which may use other means of engagement.

25

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this
30 specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except
5 combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be
10 replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

15

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying
20 claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A tool for aiding the removal of a fastening member from a structure to which it is attached by means of a threaded connection, the tool comprising: an elongate body member (30) having first and second ends, the first end having means (31) for deforming an end face of the fastening member to provide an area of purchase thereon; and means (44) to cause rotation of the fastening member to unscrew the fastening member from the structure.
2. A tool according to claim 1, wherein the fastening member comprises a nut or stud.
3. A tool according to claim 1 or 2, wherein said means to cause rotation comprises attachment means for the attachment of an operating member (44).
4. A tool according to claim 3, wherein the attachment means is located at the second end of the body member (30).
5. A tool according to claim 3 or 4, wherein the means to cause rotation, the attachment means or the operating member comprises an impact means (44) for both imparting a blow to the tool and providing the means for rotation.
6. A tool according to claim 5, wherein said impact means is an integral part of said tool.
7. A tool according to any of the preceding claims, wherein the means for deforming the fastening member comprises at least one cutting means (31') for biting into said end face.

8. A tool according to claim 7, wherein the cutting means includes an angled cutting edge.

5 9. A tool according to claim 7 or 8, wherein the cutting means comprises a blade ring (31) having blades arranged around an aperture formed in the blade ring.

10 10. A tool according to claim 8 wherein the cutting means comprises at lease one blade (14) which is demountably attached to the elongate body.

15 11. A tool according to claim 10, wherein the tool includes means (20) for securing the blade (14) to the elongate body.

20 12. A tool according to any of claims 7 to 11, wherein the or each blade (14) is handed, so as to be orientatable in a first configuration for use with fastening members having a right handed threaded attachment, and to be orientatable in a second configuration for use with fastening members having a left handed threaded attachment.

25 13. A tool according to any of the preceding claims, wherein the first end of the body member is provided with an aperture running longitudinally through the centre of the body member.

30 14. A tool according to claim 13, wherein blades (14A, 14B) are provided on opposing sides of the aperture.

15. A tool according to claim 9 or 14, wherein the aperture enables a bolt or similar object, on which is threaded a

fastening member, to be lowered into the body member such that the blades (14, 31) come into contact with an end face of said fastening member.

- 5 16. A tool according to any of the preceding claims, wherein locating means (38) for locating the first end of the body member with respect to the end face of a fastening member are provided.
- 10 17. A tool according to claim 16, wherein the locating means (38) comprise centralising means.
18. A tool according to claim 17, wherein the locating means (38) comprises a mandrel for engagement with the end
15 face of the fastening member.
19. A tool according to claim 18 or 19, wherein the leading end of the mandrel (38) is tapered.
- 20 20. A tool according to claim 18 or 19, wherein the mandrel (38) is spring mounted within the body member.
21. A tool according to any of the preceding claims, wherein the tool is provided with means (43) for preventing
25 peripheral damage to the structure.
22. A tool according to claim 21, wherein a cover or shroud (43) is provided to surround the means for deforming the end face of the fastening member.
- 30 23. A method for facilitating the removal of a fastening member from a structure to which it is attached by means of a threaded connection, the method comprising:

deforming an exposed end face of the fastening member to provide an area of purchase thereon; and

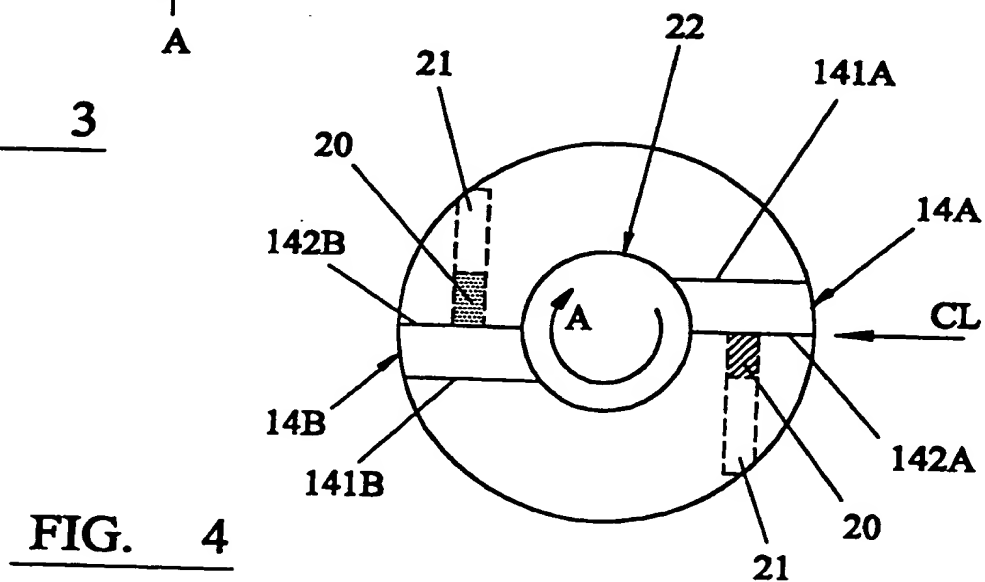
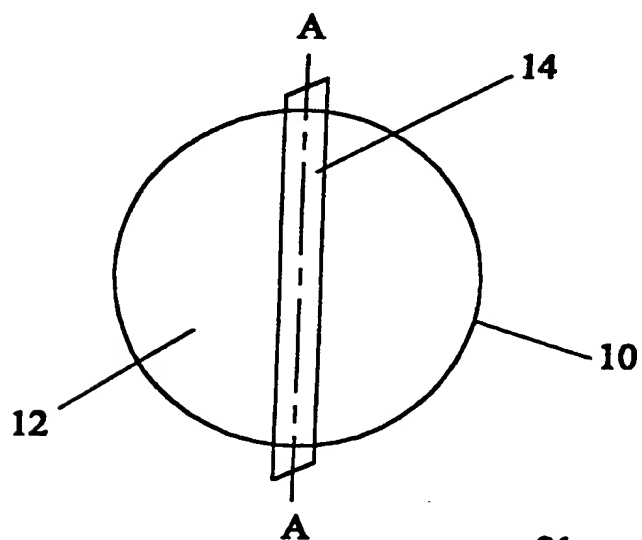
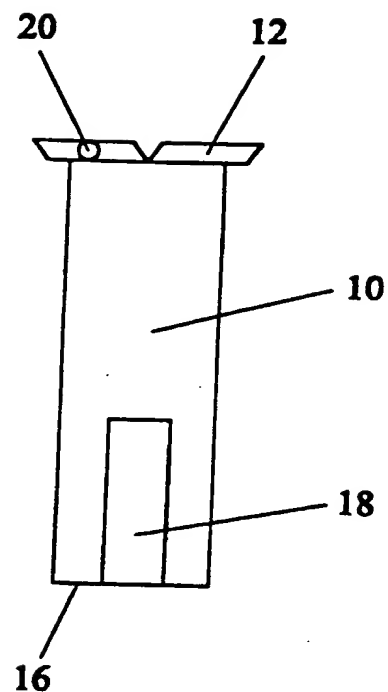
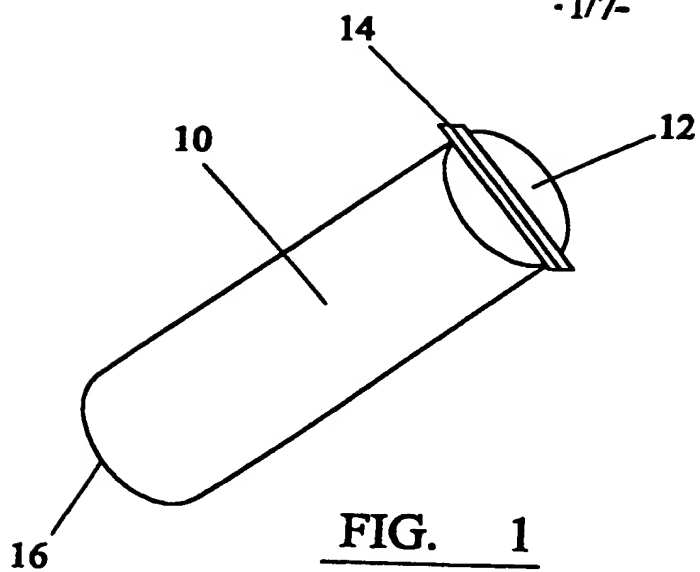
5 rotating the fastening member using said area of purchase.

24. A method according to claim 23, wherein the method includes the preliminary step of locating a first end of a
10 tool according to any of claims 1 to 21 with respect to the end face of the fastening member.

25. A method according to claim 24, wherein the locating step comprises the use of a centralizing means for
15 centralizing the tool with respect to the end face of the fastening member.

26. A method according to claim 23, 24 or 25, wherein a region surrounding the fastening member is protected from
20 damage by shrouding that area.

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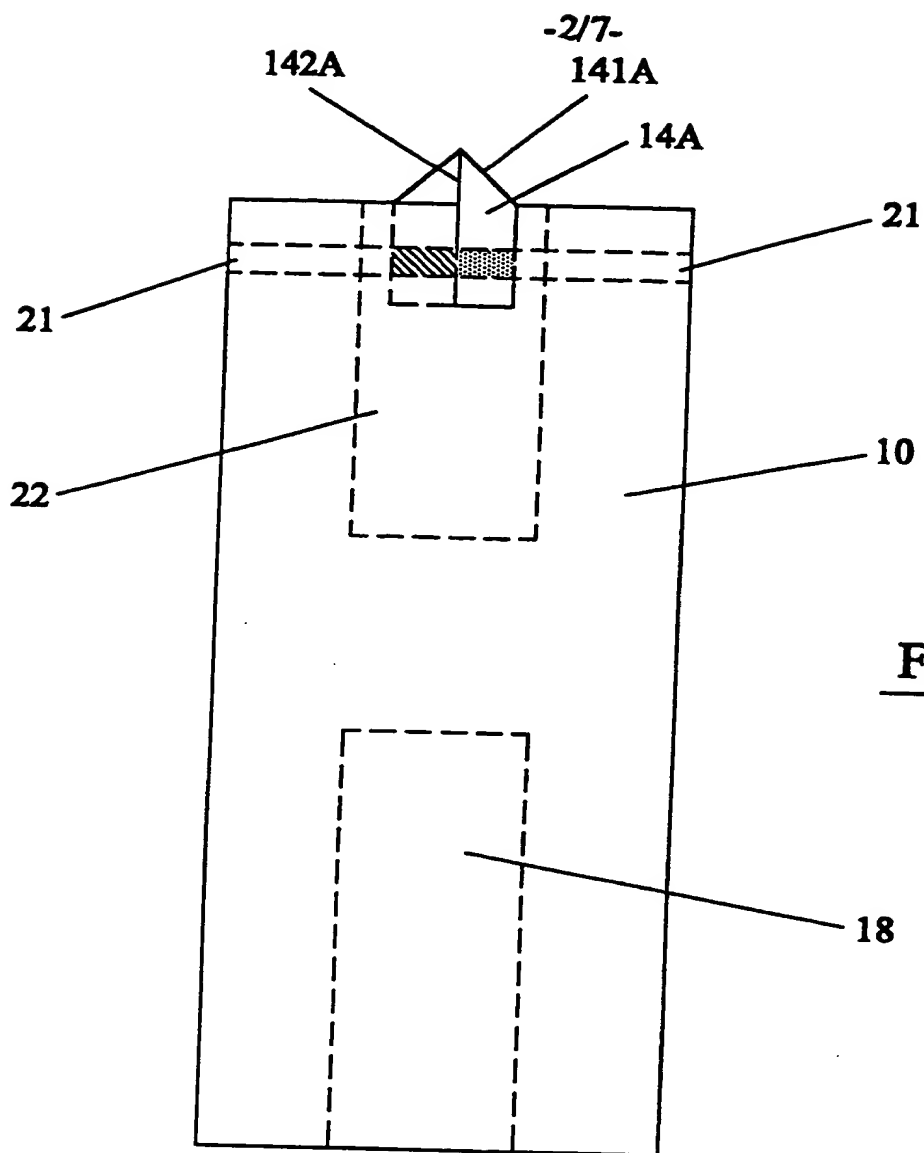


FIG. 5

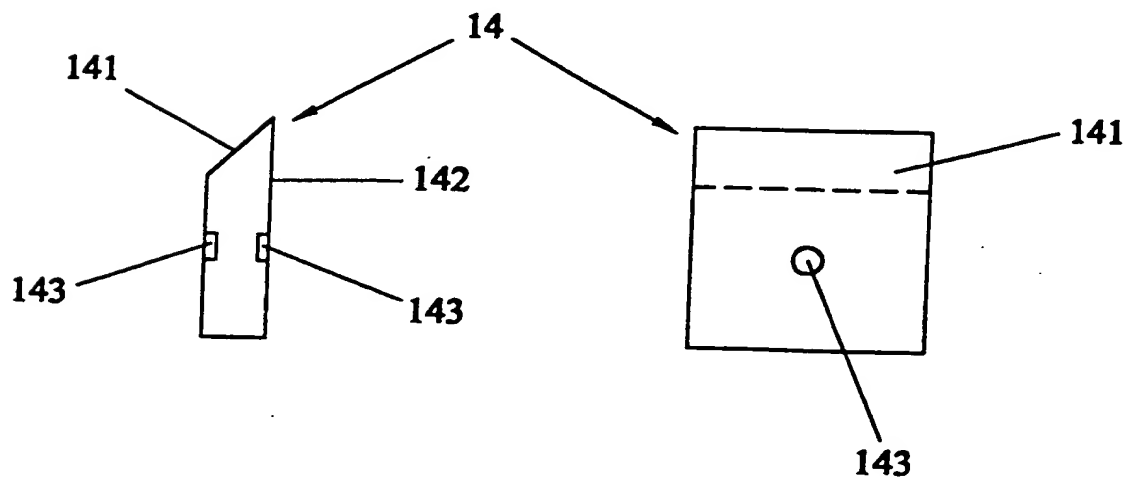
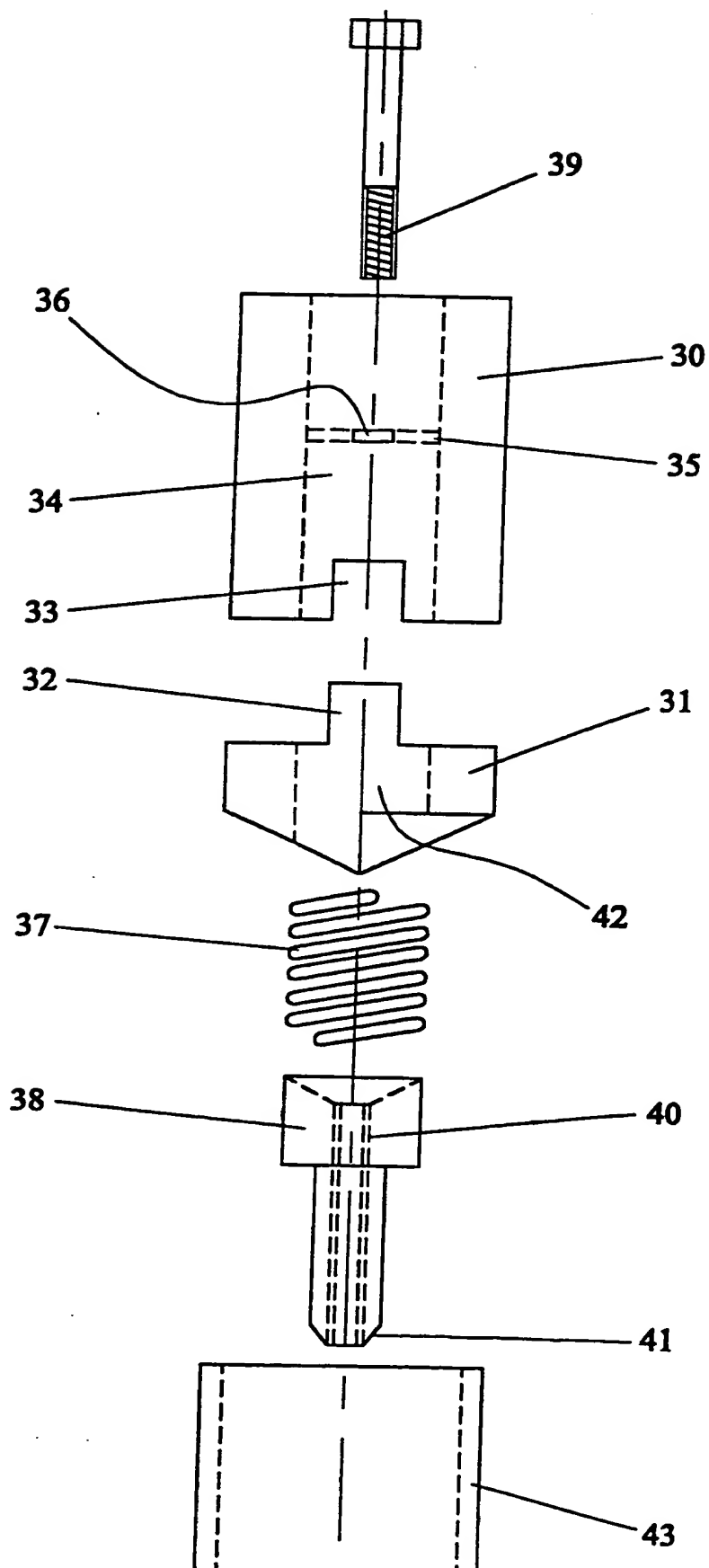


FIG. 6A

FIG. 6B

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FIG. 7

-4/7-

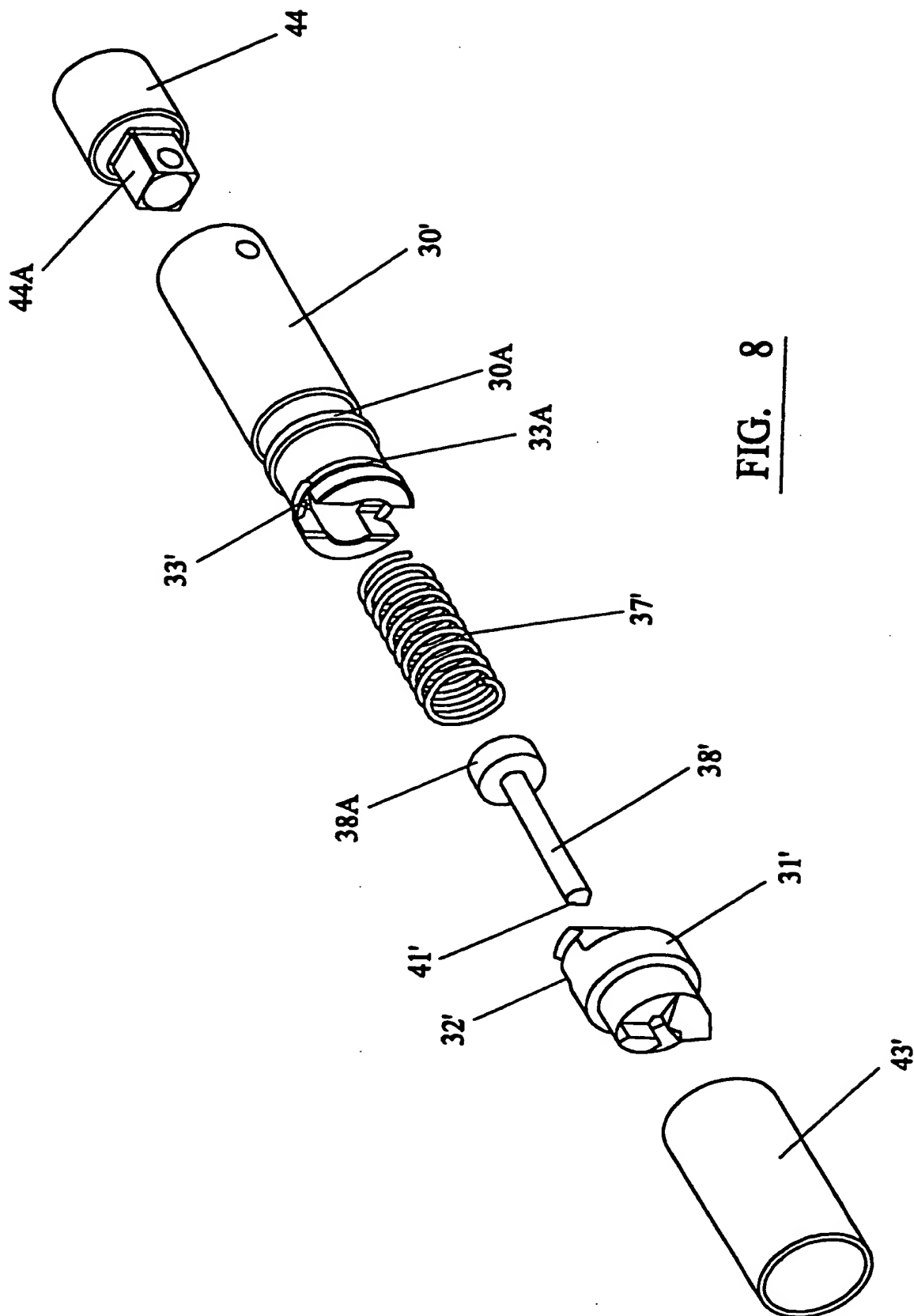


FIG. 8

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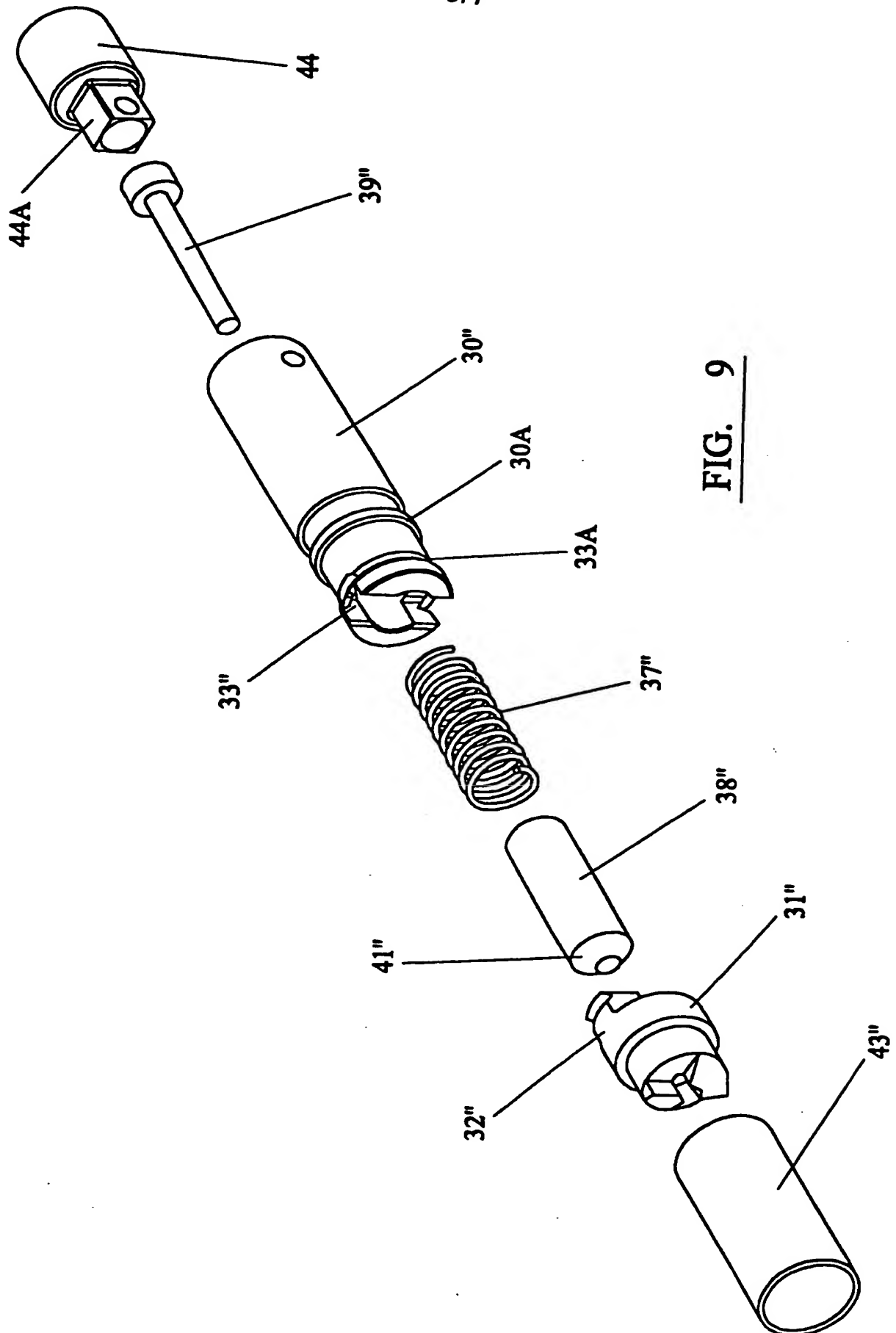


FIG. 9

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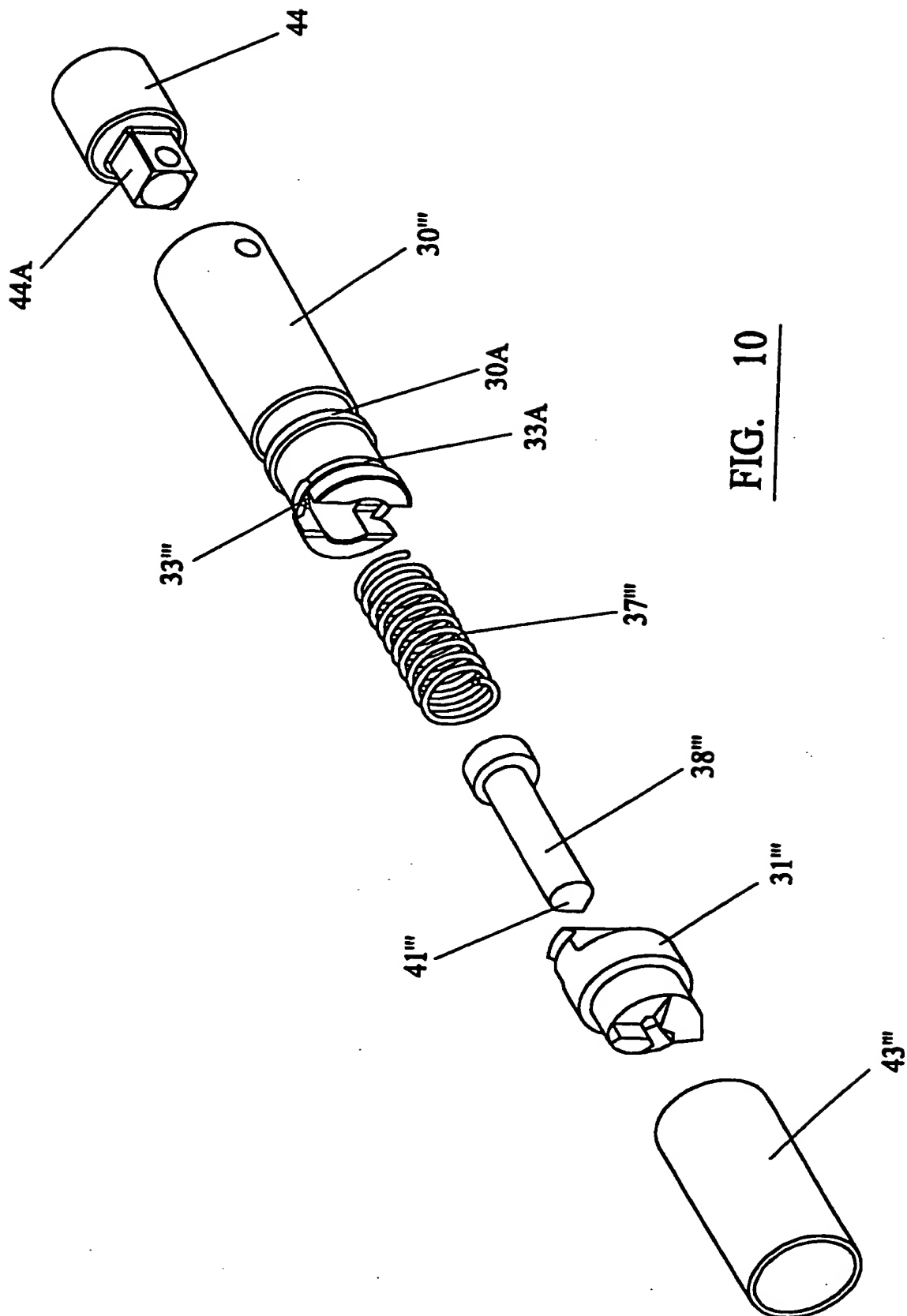


FIG. 10

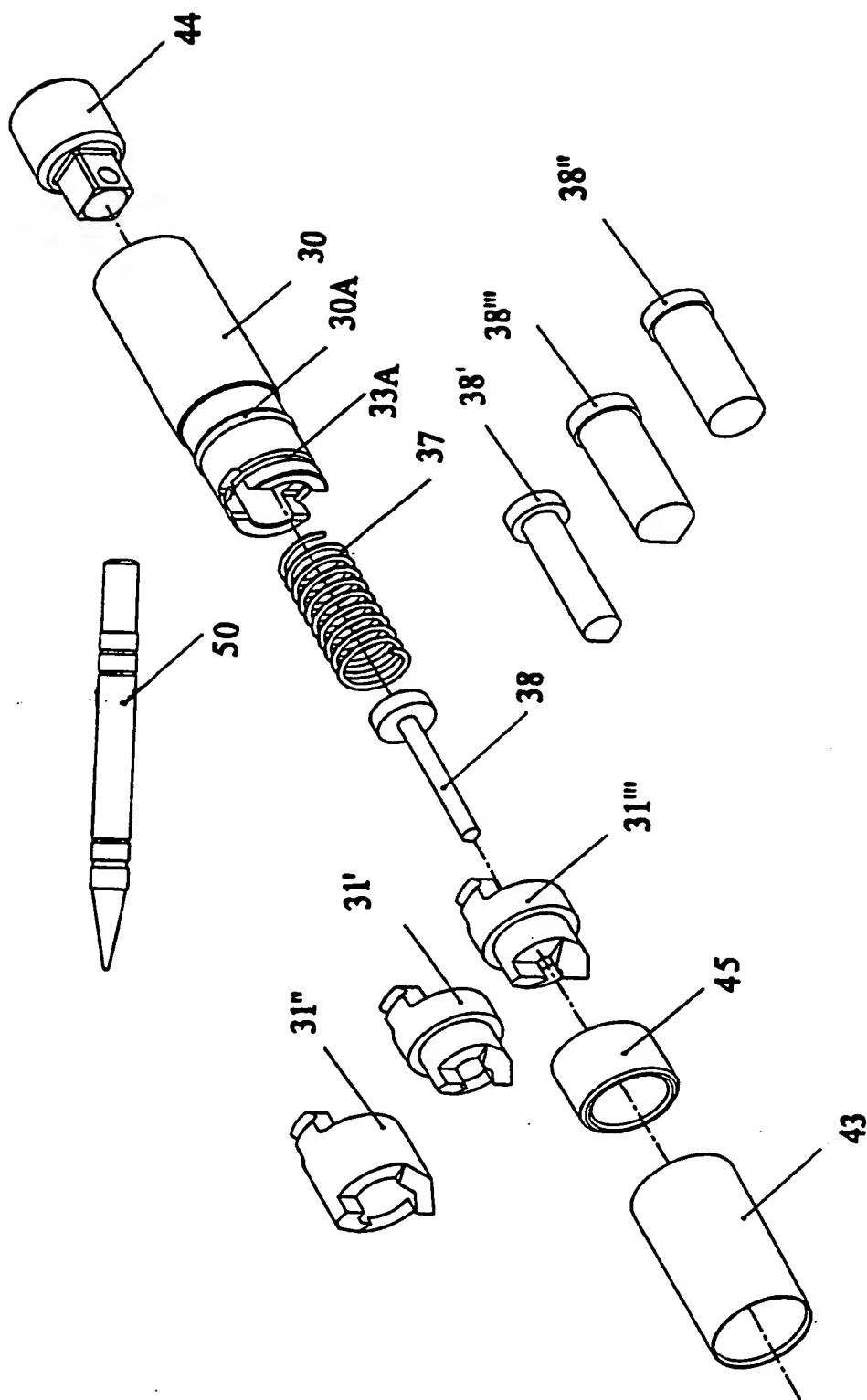


FIG. 11

INTERNATIONAL SEARCH REPORT

Inte onal Application No

PCT/GB 99/04137

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B25B27/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter. Patent Application No

PCT/GB 99/04137

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